SAA NEWSLETTER

Standards Alumni Association
National Institute of Standards and Technology
Gaithersburg, MD 20899-0952

Vol. 21, No. 3 | Founding President: Churchill Eisenhart (1913-1994) | September 2005

New Director Takes NIST Helm

Dr. William Alan "Bill" Jeffrey was sworn in as the 13th of the directors of NIST and its predecessor, NBS, on July 26. President Bush nominated Jeffrey on May 25 to succeed Arden Bement, who was appointed director of the National Science Foundation in November of last year. Jeffrey was confirmed by the Senate on July 22. He comes to NIST with experience in federal science and technology programs and policy dating from 1988, most recently as senior director for homeland and national security and the assistant director for space and aeronautics at the Office of Science and Technology Policy (OSTP) within the Executive Office of the President. Before that, he was the deputy director for the Advanced Technology Office and chief scientist for the Tactical Technology Office with the Defense Advanced Research Projects Agency (DARPA). While at DARPA, Dr. Jeffrey developed research programs in communications, computer network security, novel sensor development and space operations. Prior to joining DARPA, he was the assistant deputy for technology at the Defense Airborne Reconnaissance Office, where he supervised sensor development for the Predator and Global Hawk unmanned aircraft and oversaw the development of common standards that allow for the transfer of imagery and intelligence information across service and agency bounds. Jeffrey received his B.Sc. in physics from MIT and his Ph.D. in astronomy from Harvard University.

The SAA requested a meeting with the new director to raise his awareness of SAA and its activities, to explore future SAA assistance to NIST and to hear his impressions of and plans for the Institute. SAA Vice President Dick Wright began the conversation by describing SAA's objectives and mentioning as examples our responsibility for the NIST Gallery of Distinguished Scientists, Engineers and Administrators (the 'Portrait Gallery') and SAA participation in new-employee orientation by providing briefings on NIST culture and history—a new activity. He stressed that the SAA is deeply interested in preserving the history of the agency and cooperates with the Museum Committee and the Information Services Division to do this.

Dr. Jeffrey knew of the SAA in a general way, having attended our July quarterly meeting and read a couple of *SAA Newsletter* issues. He expressed both his appreciation for SAA support of NIST and his willingness to explore more possibilities for using the talent of alumni.

Our new director is 45 years of age and has been involved with science management in the government since 1988, when he came to the Washington area "….to stay for no longer than one year…." He lives in Herndon, VA, but is in the process of moving to the Gaithersburg-Germantown area. Jeffrey is an avid back-packer, having hiked trails as far off as New Zealand. Asked if he has walked the Appalachian Trail, he responded that he has enjoyed nearby parts of it and has favorite areas in West Virginia, but will keep a hike of its full length for a possible retirement activity.

He spoke of opportunities to enhance the NIST role nationally in terms of innovation. Innovation is a key ingredient to the successful U.S. economy of the future, especially now—given the global nature of economics, less expensive labor elsewhere and the declining costs of transporting materials and products around the world. Those at policy levels in both government and industry are increasingly aware of its importance . Jeffrey said that NIST is "at the nexus of innovation and commerce nationally." With opportunities come challenges, of course. NIST must position itself to maximize its support to the economy, both through strategic planning and by ensuring that policymakers understand its role and strengths—and the importance of maintaining that strength. He spoke of the need to maintain the excellence for which NIST is respected, and noted that this

INSIDE THIS ISSUE:

CONTENTS

must be done by strengthening the agency's core competencies, both individually and institutionally. NIST can achieve its best leverage by helping industry to adopt new technology.

Jeffrey offered the NIST Center for Neutron Research and the Advanced Measurement Laboratory as examples of national resources and would encourage similar roles for other NIST programs and facilities—NIST must engage industry more fully! He also discussed national and international normative standards and a need for NIST to lend its expertise to their development as a means of enhancing the efficiency of trade and exchange.

In speaking of the demands on NIST from outside, he cited the three major thrusts of the Bush Administration's policy: the war on terror, homeland security and economic security. While NIST plays only a peripheral role in the first, it supports numerous technology aspects of the second, and is in the vanguard of efforts to ensure the future economic security of the country. Jeffrey finds it easy to articulate the importance of NIST to the country in these terms. NIST is known by many in the Administration and in Congress as "the go-to place", another good reason to preserve technical credibility and the culture that produces it. He gave projects on voting-machine integrity, the protection of the mail service from bio-terrorism and information security as responses to recent problems that NIST has been asked to attack.

Dr. Jeffrey views the SAA as being vitally important because its goals is to foster the NIST tradition of excellence, encouraging present staff to live it and passing it on to new and future employees. Anything that we can do to help people feel themselves to be a part of something bigger will aid in attracting and retaining talented staff. Several times during our discussion, he brought up the topic of competency and his desire to bolster it through education, recruiting and retention of NIST employees.

He sees the U.S. Measurement System study (see the June issue of the *SAA Newsletter*) being used to develop a picture of the long-term needs of the economy, not just for NIST services, but for industrial planning as well. The study will be based on NIST information-gathering efforts—symposia and the like—and on the over 200 roadmaps of future directions developed by industrial consortia. It will affect NIST investment decisions beginning in a few years and will be used to guide strategic planning for the out years. Jeffrey also expects it to raise awareness of the measurement system in the executive levels of government and industry, and thus enhance recognition of NIST and its contributions to the nation.

It was abundantly clear from the meeting that Dr. Jeffrey is well-versed on policy issues and is learning more of the individual programs on a daily basis. He is enthusiastic and energetic, and is keen on the institution, its history, culture and potential. And, he has the background and experience in government to promote better use of NIST assets in the service of the country.

—Norm Belecki and Dick Wright

1. MESSAGE FROM PRESIDENT KRUGER

Scientific Misbehavior

In the June 9 issue of the Washington Post is an article entitled "Many Scientists Admit to Misconduct". It describes a study from the HealthPartners Research Foundation in Minneapolis, which sent a survey to thousands of scientists funded by NIH and received anonymous replies from 3,247 of them. The response indicated that, "Just 0.3 percent admitted to faking research data, and 1.4 percent admitted to plagiarism. But lesser violations were far more common, including 4.7 percent who admitted to publishing the same data in two or more publications to beef up their resumes and 13.5 percent who used research designs they knew would not give accurate results."

Question: Did and does NBS/NIST have standards that prevent such infractions? I am not that naive as to believe that NBS/NIST had or still has standards in place to take care of **all** of the problems found in the survey, but there are in place certain standards. Moreover, there are some standard safeguards employed by WERB that are stricter than, for example, those in universities (I have worked for both!). I found that in the university environment one could attempt to publish anything without internal review.

It used to be somewhat annoying to be delayed by the WERB review process in sending out a paper. But in the end, a better paper resulted and the review was appreciated. The medicine was sometimes bitter but it helped to maintain better standards. WERB reviews were not perfect and did not overtly address some of the problems quoted above. That being said, the requirements of the WERB procedure for Division, extra-Division and editorial-board reviews make it very difficult for a researcher to falsify or plagiarize results. (And, as a practical matter, our papers had an easier time in journals' review processes because of the improvements required by WERB standards.)

JOIN

VOLUNTEER

RECRUIT

2. OCTOBER 27 QUARTERLY MEETING

The Subject: *Improving Trust and Confidence in Voting Systems: NIST's Role in Helping America Vote*

The Speaker: Dr. Shashi Phoha, Director, Information Technology Laboratory

At the October meeting of the Standards Alumni Association, Dr. Shashi Phoha, ITL Director, will discuss NIST contributions to improving the trust and confidence of voters in future elections. After the 2000 Presidential election, the U.S. Congress considered landmark legislation to ensure public trust in the nation's voting system. Long before, in 1975, NBS computer scientist Roy Saltman had published the first of two seminal research papers on security challenges related to computerized voting technology. In October 2002, the President of the United States signed the Help America Vote Act (HAVA). The law recognized NIST's research strengths in security standards for computers, human factors and laboratory accreditation that were relevant to specifying standards for the next generation of electronic voting systems.

HAVA assigned NIST a critical technical role in improving voting systems through voluntary-standards development and laboratory accreditation. To assist the newly-created Election Assistance Commission (EAC) with the development of voluntary voting-system guidelines, HAVA established the Technical Guidelines Development Committee (TGDC) and directed NIST to chair the TGDC and to perform research in its support. In addition, the law instructed NIST to recommend non-governmental laboratories for accreditation in the testing and certification of voting systems used in all U.S. elections. The Information Technology Laboratory has provided essential guidance to the TGDC and the EAC., In May 2005, NIST delivered to the EAC its recommendations for initial voluntary voting-system standards within the nine-month period required by the HAVA statute. In addition, National Voluntary Laboratory Accreditation Program (NVLAP) has initiated a search for laboratories to certify voting systems under its rigorous requirements.

Our speaker will address how NIST scientists will continue to assist the EAC and the election community at large to ensure that all Americans have increased confidence that their votes are cast and counted accurately in every election.

Dr. Phoha has held senior technical and management positions in academia, government and industry. Since 1991, She has been (and continues as) a Professor of Electrical and Computer Engineering at the Pennsylvania State University and the Director of the Division of Information Sciences and Technology at Penn State's Applied Research Laboratory. Prior to that, she was the Director of the Information Systems Analysis Division of Computer Sciences Corporation where she led the development of the Global Transportation Network Architecture for DoD. She headed the Command, Control, Communications and Intelligence Systems Department at ITT Defense Communications from 1984 to 1990. Previously, she worked at the MITRE Corporation where she developed

(continued on next page)

architectures, software and protocols for global information systems, and led the simulation and modeling effort for modernizing the Command and Control system at NORAD.

Dr. Phoha has pioneered new research directions in computational sciences that enable dependable distributed automation of multiple interacting devices. Her methods are being applied to anomaly detection in complex software systems, multi-robot control, Internet security and secure distributed computing, as well as damage mitigation in electro-mechanical systems.

She was awarded the 2004 *Technical Achievement Award* by the IEEE Computer Society. She has published over 200 research papers, two books and several book chapters, and has two patent applications in her name. Dr. Phoha chaired the Springer-Verlag Technical Advisory Board during 2001-02 for publishing the *Dictionary of Internet Security.* She was Guest Editor for Special Issues of IEEE Transactions (TMC), an associate editor of the IEEE *Transactions on Systems, Man, and Cybernetics* for four years and is editor of the *International Journal of Distributed Sensor Networks*. She received her M.S. in Operations Research from Cornell University and her Ph.D. from Michigan State University.

In the afternoon, we will visit an ITL Lab. Don't miss this opportunity to meet Dr. Phoha and to learn more about NIST's role in activities of great interest to SAA members.

The schedule for Thursday Oct. 27 is:

11:00 a.m. Lecture Room B
Improving Public Trust and Confidence in the Voting Systems: NIST's Role in Helping America Vote

Dr. Shashi Phoha

12:30 p.m. NIST Cafeteria
Lunch

1:20 p.m. NIST North
Lab tour to be announced

2:30 p.m. Dining Room C
Hospitality—Karma Beal, Hostess

Security Note: To gain entrance to the NIST site, stop at the Visitor's Center at the main gate where the names of SAA members are on file. You must show photo identification to obtain a name tag and access to NIST. Other guests should contact the SAA office at least two days prior to the meeting.

—Reeves Tilley

3. REPORT ON THE JULY 14 QUARTERLY MEETING

The Subject:
NIST Response to the World Trade Center (WTC) Disaster

The Speaker:
Dr. Shyam Sunder, Deputy Director,
Building and Fire Research Laboratory (BFRL)

Richard Wright, SAA Vice President, introduced Dr. Shyam Sunder as SAA's guest speaker. He noted that Sunder was hired from MIT in 1994 as Manager of BFRL's High-Performance Construction Materials and Systems Program by SAA's Geoffrey Frohnsdorff, then Chief of BFRL's Building Materials Division. During 1996–1998 Sunder was on assignment to NIST's Program Office. He returned to BFRL as Chief of the Structures Division (now the Materials and Construction Research Division) and became Deputy Director of BFRL in 2004.

Sunder, who is also the NIST lead investigator of the World Trade Center (WTC) building collapses, presented an interesting review of the complex and sophisticated investigation performed by the NIST team during the past four years. The principal NIST laboratories participating in the investigation included BFRL, the Materials Science and Engineering Laboratory and the Information Technology Laboratory. Many other organizations, including 25 contractors, were involved in performing selected structural and fire analyses and data and information collection. The NIST team worked closely with the National Construction Safety Team (NCST) Advisory Committee members, a blue ribbon committee appointed by former Director Arden Bement, who reviewed all NIST WTC investigation progress. NCST is modeled after the National Safety Transportation Board.

The Background

This was one of the worst-ever building disasters in history, killing 2,749 persons. More than 400 fire and emergency responders were killed—the largest loss of life for this group due to a building collapse. Immediately after the WTC collapse there was strong demand from Congress and the pubic and private sectors for a comprehensive investigation of the disaster. Congress charged NIST with performing the WTC Investigation, undertaking research and development on preventative measures, and developing information-dissemination mechanisms and technical-assistance programs. The focus was on determining:

- why and how the WTC Towers and the adjoining 47-story building, collapsed (this presentation did not address the latter);
- why the numbers of injuries and fatalities were so low or high depending on location, considering technical aspects of fire protection, occupant behavior, evacuation and emergency response,
- procedures and practices used in the design, construction, operation and maintenance of the WTC buildings; and

• areas in current national building and fire-model codes, standards and practices that require revision.

Both towers were struck by Boeing 767 aircraft. Tower 1 was struck on its north façade between the 93rd and 99th floors at 08:46:30 and collapsed after 102 minutes. Tower 2 was struck on its south façade between the 77th and 85th floors at 09:02:59 and collapsed 56 minutes later. One of the main questions facing NIST was: Why did WTC 1 stand nearly twice as long as WTC 2 before collapsing though they were hit by nearly identical aircraft? The answer lies in the angles of impact on the building, the aircrafts' points of contact with the buildings and the resulting fire loads. For WTC 1, the point of impact was close to the center and nearly normal to the building. The point of impact on WTC 2 was close to the corner and at an angle. Extensive structural and fire analyses were performed for both conditions. Aircraft damage analysis demonstrated that the impact of a fuel-filled wing section resulted in extensive damage to the exterior wall panel, including complete failure of the perimeter columns. Analysis also revealed that the aircraft-impact damage did not, by itself, initiate the building collapse. The two towers were designed to withstand hurricane wind loads. Structural analyses revealed the fundamental frequencies of both buildings remained unchanged from their original design and that the buildings could have withstood a hurricane even after the aircraft impacts. Other design factors enhanced the buildings' performance. They included dense spacing of perimeter columns with deep spandrels that helped redistribute loads from severed adjacent columns. Also, the hat trusses designed to support TV and other antennae on top of the towers connected the core columns to the perimeter walls and redistributed loads from the damaged columns and resisted significant weakening of the core. Without them, the towers might have collapsed sooner.

NIST researchers analyzed more than 7,000 photographs of the collapse and 150 hours of videotape to understand better the results of the aircraft impact and the visual conditions of the structures before their collapse. Photographic evidence also guided the development of collapse hypotheses. The researchers modeled the fires to determine their heat release. About 33 percent of the aircraft fuel was consumed in the fireball, about 15 percent in the initial impact, and the remainder within the building. The jet fuel was burned off within the first 10 minutes after impact; the remaining fires were burning building contents. Each floor of the damaged buildings was modeled for fire loads.

The Collapse

The towers collapsed from the weakening of structural members due to the fires. The aircraft ruptured the sprinkler and water supply systems. Jet fuel was dispersed over large areas of the building and ignited building contents, including aircraft debris. Fireproofing was damaged and dislodged from structural components and that, coupled with damaged ceilings, enabled unabated heat transport throughout the damaged floors. The building damage also allowed a significant increase of the air supply, resulting in substantially higher thermal-energy release rates and rapid fire spread to multiple floors.

Human Behavior, Evacuation and Emergency Response

As for the human-behavior component of the study, over 1,000 interviews were conducted with building occupants and with 116 emergency responders. The interviews were performed to determine the behavior and fate of occupants and responders by collecting and analyzing information on occupant behavior, human factors, egress, and emergency communications in each building. It was estimated that 17,000 occupants were in the towers at the time of aircraft impact; about six percent of them had pre-existing mobility limitations. About 87 percent of the occupants escaped; more than 99 percent who worked below the floor of impact were able to evacuate to safety.

The buildings were about 1/3 occupied on that morning; normally 25,000 persons occupy each building. If the towers had been fully occupied, evacuation would have required four hours and as many as 14,000 people could have lost their lives. It was found that occupants evacuated at a slower rate than during fire drills. It was learned from the interviews that occupants were unprepared for the physical challenge of an evacuation while in business attire and, especially, while wearing high-heeled shoes. Moreover, all three stairwells in Tower 1 were destroyed, as well as two stairwells in Tower 2. In addition, emergency responders attempting to assist occupants and extinguish fires required about two-minutes to ascend each floor; more than two hours would be required to reach the 60th floor. Communications were hampered by distorted radio signals within the steel buildings. There were no protocols for the use of the limited number of emergency frequencies available. (During an average building fire, tens of emergency responders are engaged, not many hundreds, as in this case.)

For More Information

The above are a few of the findings Dr. Sunder shared with the SAA members. Greater details can be found in NIST's report for public comment, *Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers* (Draft), NIST *NCSTAR 1* (Draft) and the NIST web site <http://wtc.nist.gov>. A WTC Conference to discuss the comments and agree on the final report's recommendations has been scheduled for September 13–15, 2005 at NIST.

Tour of BFRL's Large Fire Laboratory

During the afternoon, the SAA was hosted by Alexander Maranghides, manager of the BFRL Large Fire Laboratory (LFL) in Building 205. The size of the LFL facility is 27 m x 37 m. It has three instrumented hoods, or calorimeters, that are used to measure heat release rate (HRR). For a reference, a small trashcan loaded with paper products has a HRR of approximately 50 kW. A fire with a heat release rate of 50 kW has flames approximately 0.6 m high with a base of 0.3 m on each side. BFRL's small hood or furniture calorimeter measures 3 m x 3 m and has a capacity of approximately 750 kW. It is used to

(continued on next page)

burn individual pieces of furniture. The medium hood is 6 m x 6 m and has a capacity of 3 MW. Several items can be burned under this calorimeter at one time. The large hood measuring 9 m x 12 m allows fire experiments to be carried out with HRR as large as 10 MW (the HRR for a small house). The LFL has a variety of instrumentation for measuring temperature, mass, pressure, thermal radiation, smoke concentration, and real time gas concentrations for oxygen, carbon dioxide, carbon monoxide, nitrogen oxides and hydrocarbons.

This facility played key roles in performing WTC fire investigations—including that of creating a $(12\ m)^2$ section of one floor of the WTC with furniture, work stations, wall finishing, carpet, and ceiling nearly identical to those used by one firm occupying that location of the WTC.

Maranghides highlighted some BFRL fire research in the facility:

- Residential Structures: The proximity of vinyl-sided residential structures can influence fire initiation on the adjacent building from heat radiation. BFRL is developing data on the physics and chemistry of fires and methods to reduce flame spread that will serve as a technical basis for changes in fire standards and codes.

- Mattresses: Burning mattresses and bedding generate large amounts of energy. The State of California adopted test protocols based on NIST fire research. They are being evaluated for adoption by the Consumer Product Safety Commission.

- IR Camera Standards: Infrared cameras are an important fire-fighting tool for locating occupants and firefighters trapped or operating in fires and for identifying hot spots. As there are no standards for fire departments to use in selecting the cameras capable of differentiating soot, aerosols, dust and other barriers, BFRL is working with leading manufacturers and end-users to draft an IR camera standard.

- Protective Clothing: BFRL's fire researchers are developing protocols for thermal-test apparatus for fire-fighters' protective clothing and equipment ensembles.

- Fire threats in the wilderness-urban interface: BFRL's fire researchers are developing measurement methods of the heat-release rate and radiant heat of single trees for extrapolation to a stand/cluster of trees. This will provide tools and comprehensive databases to assess accurately the vulnerability of communities to wilderness fires; strategies for natural fuel management in forests; tactics to make best use of limited resources; and data to assess fire conditions rapidly for first responders.

—Noel Raufaste

The following SAA members and guests attended the July 14 meeting:

John Albers
Karma Beal
Oliver Borchert
Robert Celotta
Sam Coriell
Bohdan Dobriansky
Geoff Frohnsdorff
Larry Galovin
Ken Gordon
Omar Halmat
Peter Heydemann
William Jeffrey
Betty King
Ralph Krause
Isador Liwant
Rosemary MacDonald
John McKinney
Ron McKnight
Henri Mitler
Tom Murphy
Donald Novotny
Hans Oser
Susan Permut
Dan Pierce
Cedric Powell
Ted Prince
Noel Raufaste
Richard Raybold
Lawrence Schmid
K Sviram
Summerfield Tillett
Reeves Tilley
Clyde Washburn
Richard Wright
Jim Wyckoff
Kenneth Yee

4. NIST NEWS

Code Breaking Possible With Future Quantum Computers

Scientists of the Time and Frequency and Mathematical Modeling Divisions, with colleagues from the Max Planck Institute für Quantenoptik of Germany and New Zealand's University of Otago, have demonstrated a crucial step in a procedure that could enable future quantum computers to break today's most used encryption codes.

The team reported in the May 13 issue of the journal *Science** that it is possible to identify repeating patterns in quantum information stored in ions. They used three ions as quantum bits (qbits) to represent ones or zeros, or—under the unusual rules of quantum physics—both at the same time. It is believed that much larger arrays of such ions could process data in a powerful quantum computer. Previous demonstrations of similar processes were performed with qbits made of molecules in a liquid, a system that cannot be expanded to large numbers of qbits.

"Our demonstration is important, because it helps pave the way toward building a large-scale quantum computer," says John Chiaverini, lead author of the paper. "Our approach also requires fewer steps and is more efficient than those demonstrated previously."

Electromagnetically trapped beryllium ions were used by the NIST team as qbits to demonstrate a quantum version of the Fourier-transform process, a widely used method for finding repeating patterns in data. The quantum version is the crucial final step in Shor's algorithm, a series of steps for finding the 'prime factors' of large numbers; the prime numbers that, when multiplied together, produce a given number.

A color image showing the fluorescence from three trapped beryllium ions illuminated with an ultraviolet laser beam can be found on the NIST Web site:

<http://www.nist.gov/public_affairs/images/05PHY010_Fourier3ions_HR.jpg>.

*J. Chiaverini, J. Britton, D. Leibfried, E. Knill, M.D. Barrett, R.B. Blakestad, W.M. Itano, J.D. Jost, C. Langer, R. Ozari, T. Schaetz and D.J. Wineland, *Implementation of the semi-classical quantum Fourier transform in a scalable system,* **Science**, May 13, 2005.

Source: *NIST Tech Beat*, May 18, 2005

Shadow Technique Improves Measurement of Micro Holes

A new measurement method,* developed by Guest Researcher Bala Muralikrishnan from the University of North Carolina at Charlotte, and Jack Stone and John Stoup of the Precision Engineering Division, uses the shadow cast by a small glass probe to infer the dimensions of tiny, microscale holes or other micrometer sized components. Dimensions can be determined with a standard uncertainty of about 35 nm (k=1). Holes as small as 100 µm in diameter can be measured. The technique may provide an improved quality control method for measuring the interior dimensions of fuel nozzles, fiber optic connectors, biomedical stents, ink-jet cartridges and other precision-engineered products.

Designed to be implemented with the type of coordinate measuring machine (CMM) routinely used in precision manufacturing, the essential component of the probe is a flexible glass fiber 20 mm long and 50 µm in diameter with a microsphere approximately 70 µm in diameter on one end. The probe is attached to the CMM positioning system. It should be noted that NIST retiree and SAA member Wolfgang Haller made significant contributions to the production of the glass fibers.

The measurement process is started by having the CMM move the probe over the part to be measured, and inserting it into a hole or other feature of interest. It is inserted to a depth where the measurement will be made, while keeping as much of the fiber shank exposed for viewing as possible. It is then moved so that the ball at the end of the fiber contacts the part surface. The force of the surface pushing on the ball causes the fiber to bend. This bending is seen as a deflection of the fiber by two microscopes at right angles to each other and focused on the same segment of the shank about 7 mm above the ball and, of course, above the part. A single video camera views the images from the two microscopes, providing deflection information in two directions perpendicular to each other.

The position of the surface in contact with the probe tip must be inferred from the observed deflection of the glass fiber as seen in the pixel arrays of the cameras. This relationship depends on several factors, including the magnification of the microscopes, the distance from the point of observation on the fiber to the probe tip and the size of the camera pixels. A calibration procedure determines the ratio by moving the contact surface relative to the probe tip by interferometrically measured amounts, and then calculating the number of pixels of deflection corresponding to a given motion. After this calibration, the position of the surface relative to a fixed point on the probe is calculated and the probe reading combined with the readings of the CMM machine scales gives the position of a point on the surface relative to the CMM coordinate system.

By recording the readings of many points on the surface of the part being measured a map of its shape and size may be produced and analyzed.

Part of the reason this method can detect such small motions of the probe (deflections as small as 10 nm can be resolved) is the 'shadow technique'. Light passing through the glass fiber is actually focused by the fiber into a bright band along its centerline that stands out against the shadow left in the surrounding area. This well-defined feature can be measured with great precision.

*B. Muralikrishnan, J.A. Stone, and R. Stoup, *Measuring internal geometry of fiber ferules,* Presented at the SME MicroManufacturing Conference, Minneapolis, MN, May 4–5, 2005.

Source: *NIST Tech Beat*, June 2, 2005, and Jack Stone

World's First UV 'Ruler' for Scientific Measurement

Scientists Ron Jones, Kevin Moll, Michael Thorpe and Jun Ye at JILA have built and demonstrated a new device that consistently generates pulses of light lasting just femtoseconds in the extreme ultraviolet region of the electromagnetic spectrum. It is described in the May 20 issue of *Physical Review Letters*.*

The device is expected to become an important tool for high-precision measurements in many fields of science—including chemistry, physics and astronomy. A ruler made with shorter wavelengths of light makes it possible to 'see' differences at higher resolutions than ever before in the energy levels of light emissions that identify specific atoms, in the timing of chemical reactions and, if additional applications are developed, in the dimensions of certain nanometer-scale objects. The new device also can be likened to a camera with hyper-fast shutter speeds and consistent shot-to-shot frame speed and stability, allowing scientists to take real-time 'pictures' of finer structures and dynamics. By combining many such pictures, scientists can gain a more detailed understanding of many phenomena.

"This ultraviolet light source has a spectacularly high resolution," says Ye, the NIST Fellow who heads the JILA research group. "On the technological side, the system we used to produce this light is simple and low cost, without active amplifiers."

*R.J. Jones, K.D. Moll, M.J. Thorpe and J. Ye, *Phase-coherent frequency combs in the VUV via high-harmonic generation inside a femtosecond enhancement cavity*, **Physical Review Letters**, May 20, 2005.

Source: *NIST Tech Beat*, May 18, 2005.

Finding the True Measure of Nanoscale 'Roughness'

An improved method for determining nanoscale 'linewidth roughness' is described in a paper* published in June by researchers at NIST and SEMATECH. This linewidth characteristic is an important quality-control factor in semiconductor fabrication. The authors find that current industry measurement methods may exaggerate roughness of the smoothest circuit features by 40 percent or more above true values.

When circuit features are below 50 nm, wavy or rough edges within semiconductor transistors may cause circuit current losses or may prevent the devices from reliably turning on and off with the same amount of voltage.

"With this type of measurement," says John Villarrubia of the Precision Engineering Division, "besides the real roughness there is also a false roughness caused by measurement noise. Our method includes a correction to remove bias or systematic error from the measurement."

Random noise, by definition, causes the measured value to be either higher or lower than the true value, and can be minimized by averaging an adequate number of measurements. Systematic error, on the other hand, is consistently above or below the true value, because of some quirk of the measurement method.

"The noise in nanoscale scanning-electron-microscope (SEM) images consistently adds extra roughness," says Villarrubia. The NIST/SEMATECH method involves taking two or more images at exactly the same location on a circuit feature, comparing their values and subtracting false roughness caused by measurement noise. SEM manufacturers should be able to incorporate the new method into their proprietary software for automated linewidth roughness measurements.

*J.S. Villarrubia and B.D. Bunday, *Unbiased estimation of linewidth roughness*, **Proceedings of DPIE**, 5752 (2005), pp. 480-488.

Source: *NIST Tech Beat*, June 16, 2005.

Sorting Nanotubes by Length for Stronger Polymers

NIST scientist Erik Hobbie and a team including scientists from the University of Kentucky and Michigan Technical University have discovered a way to sort nanotubes by length. They find that, for some reason not completely understood, nanotubes in a flowing fluid sort themselves out by length with the longer ones near the center and the shorter tubes near the edge. It took slow-neutron scattering techniques to observe this process. This is part of an on-going scientific process of turning laboratory curiosities into useful engineering materials.

Carbon nanotubes incorporated in polymer composites may provide hyper-strong bulk materials. Their conducting properties may find applications in electronic devices and their molecular structure may provide light-weight hydrogen-storage capability.

Further details of NIST's nanotube-related research can be found on the Polymer Division's website at <http://www.nist.gov/polymers>.

Source: *NIST Tech Beat*, July 26, 2005

Temperature Control Improves NIST X-ray Detector

NIST scientists have been in the forefront of developing x-ray detectors with very high energy resolution. When electrons strike a surface they may stimulate the emission of characteristic X-rays that differ for each element. Scanning electron probes are able to map the elements of surfaces such as those of microcircuits.

One of the most sensitive means of sorting out the differing energies of the X-rays emitted is by the use of a transition edge sensor, TES. In this device a detector is held at a temperature just below its superconducting threshold (about 97 mK). When an incoming photon deposits its energy on the detector the temperature rises, very slightly, but just enough to cross that superconducting threshold and, for a time, the resistance spikes. The size of that spike is a measure of the photon energy, which can be measured to ± 2 electron volts for a 6 keV photon. Other types of detectors are doing well to measure photons accurate to ± 130 eV.

The trick is to hold the sensor at just the right temperature for hours at a time. Terrence Jach, John Small and Dale Newbury of the Surface and Microanalysis Science Division have published a report detailing how they achieved the necessary temperature stability to avoid frequent recalibrations in the June 2005 issue of *Powder Diffraction,* Vol. 20, No. 2.

Source: *NIST Tech Beat*, July 13, 2005

The Eyes Have It

Biometrics is important for security in situations where personal identification is essential, such as controlling access to secure facilities, access to computers, banking transactions, crossing national borders and maternity ward identification. Fingerprints are often used, but fast computer systems now make it possible to use photographs of the iris of the eye. Using fast algorithms, iris images can be reduced to an identification number that is unique to an individual and more readily used than a fingerprint. These numbers can then be used to scan huge databases for adequate identification.

NIST is about to test the reliability of systems that claim to process iris data. The Iris Challenge Evaluation (ICE) will be a two-step process. First, participants will be provided with a large database of new iris images. They will then face the 'challenge problems': images to be identified using that database. Participants are invited to hone their system skills during this Phase One, which will last to the end of 2005.

The second phase, beginning early in 2006, will apply the participants' systems and skills to a new set of test images, and systems will be rated on their performance. A standard data set will be used so that all participants can be rated fairly.

The ICE Test Director is Jonathon Phillips of the Information Access Division. Sponsoring agencies include NIST, the Science and Technology Directorate of the Department of Homeland Security, the Office of the Director of National Intelligence and two Department of Justice agencies: the Federal Bureau of Investigation and the Intelligence Technology Information Center.

Sources: *NIST Tech Beat*, Aug. 10, 2005, and *Iris Recognition for Personal Identification* by John Daugman, The Computer Laboratory, University of Cambridge.

—John Beers and Jim Wyckoff

Congress in Recess, NIST Appropriations Bill Pending

Congress is currently in recess until the day after Labor Day. In addition to its recent confirmation of the new NIST Director, its actions regarding the FY 2006 Appropriation Bill are of most interest to NIST and its alumni. Earlier, the House had passed a bill which would fund NIST at $548.7 million, but which includes no funding for the Advanced Technology Program (ATP). In the Senate, a bill which would fund NIST during FY 2006 at $844.5 million has been approved by the full Senate Committee on Appropriations. However, Senate-floor consideration will not begin until after the August recess. If passed as it stands now, the Senate bill would fund NIST Laboratories at $400 million; the Manufacturing Extension Program (MEP) at $106 million (including funding for all of the MEP centers); the ATP at $140 million, with $60 million for new awards; and construction at $198.6 million—including $111 million earmarked for specific projects in Mississippi, Alabama, South Carolina and states of other Congressmen. After Senate passage, a House-Senate Conference will work on a compromise bill that, with luck, will be enacted before October 1, 2005.

—Esther Cassidy

5. NIST HONORS AND AWARDS

In April 2005, **Wo Chang**, a supervisory electronics engineer in the Information Access Division, received the Management Service Award from ISO/IEC SC-29, the Committee for Coding of Audio, Picture, Multimedia and Hypermedia Information. ISO/IEC JTC 1, the Plenary Organization for "Coding of Audio, Picture, Multimedia and Hypermedia Information", recognized Chang for his excellent management of standard specifications, working documents, reference software and testing materials in support of international multimedia standards development.

In July, Chang was recognized by the InterNational Committee for Information Technology Standards (INCITS) with a 2005 *INCITS Service Award*. The award cited his excellent work in support of the INCITS/L3 technical committee and its two task groups, L3.1 (MPEG) and L3.2 (Still Image Coding) and his roles as Vice Chairman of L3.1, editor of the MPEG-7 profiles and Chairman of the MPEG-7, all of which make him a valuable resource to the members.

Kevin Coakley, a mathematical statistician in the Statistical Engineering Division in Boulder, was elected a Fellow of the American Statistical Association (ASA). Coakley was recognized "for significant and broad contributions to statistical methods for physical science and engineering, development of statistical methods and software for imaging and neutron research; and for innovative research in materials science and optoelectronics." The number of newly elected Fellows is limited to no more than one-third of one percent of the ASA membership. The ASA is the world's largest membership-based professional association of statisticians and a leading publisher of archival statistical journals. Coakley was honored at the Joint Statistical Meetings held in Minneapolis, MN on August 7–11, 2005.

The American Academy of Arts and Sciences has announced that Nobel Prize-winning physicist and NIST Fellow **Eric Cornell** of JILA has been elected Fellow. He joins a class of 196 new Fellows and 17 new Foreign Honorary Members.

"Throughout its history, the Academy has convened the leading thinkers of the day, from diverse perspectives, to participate in projects and studies that advance the public good," said Executive Officer Leslie Berlowitz. "I am confident that this distinguished class of new Fellows will continue that tradition of cherishing knowledge and shaping the future."

Fellows are nominated and elected to the Academy by current members. A broad-based membership, comprised of scholars and practitioners from mathematics, physics, biological sciences, social sciences, humanities and the arts, public affairs and business, gives the Academy a capacity to conduct a wide range of interdisciplinary studies and public-policy research.

(continued on next page)

The Academy will welcome this year's new Fellows and Foreign Honorary Members at its annual induction ceremony on October 8, at the Academy's headquarters in Cambridge, MA.

Founded in 1780, the American Academy of Arts and Sciences is an international learned society composed of the world's leading scientists, scholars, artists, business people and public leaders. Its current membership is 4,000 American Fellows and 600 Foreign Honorary Members.

Hunter Fanney, **Mark Davis** and **Brian Dougherty** of BFRL were awarded an ASME *Best Paper Award* for the paper *Comparison of Photovoltaic Module Performance Measurements* at the 2005 International Solar Energy Conference. The paper was jointly written with Sandia National Laboratories' researchers David King, William Boyson and Jay Kratochvil. It is available at <http://www.bfrl.nist.gov/863/bipv/Pubs.htm>, and resulted from research sponsored by BFRL and the Advanced Technology Program.

The conference was sponsored by the International Solar Energy Society, the American Solar Energy Society, the American Society of Mechanical Engineers (ASME), the American Institute of Architects (AIA), the Wind Energy Association (WEA) and the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).

Leader of the Thermodynamics Research Center (TRC) Group in the Physical and Chemical Properties Division, **Michael Frenkel** received the 2005 *Hugh M. Huffman Memorial Award* at CalCon 2005 - The 60th Calorimetry Conference in Gaithersburg, MD on June 27, 2005.

Dr. **Cynthia Howard-Reed** of the Indoor Air Quality and Ventilation Group in the Building Environment Division received the EPA *2004 Scientific and Technological Achievement Award* in the category of Monitoring and Measurement Methods. This award was issued for her role in the work described in *Continuous Monitoring of Ultrafine, Fine, and Coarse Particles in a Residence for 18 Months in 1999-2000*. Her work was recognized for its contributions to the development of particle-measurement methods and the production of a high-quality database of indoor and outdoor particle levels. The subject study was conducted in an occupied townhouse and included measurements of particles from 10 nm to 20 µm in diameter roughly every 5 min, as well as ancillary measurements of building air-change rates, wind velocity, air temperature and relative humidity. Prior to this work no long-term study over such a wide range of particle diameters was available, and the data in this publication are expected to be used in studies of particle fate and exposure for years to come.

Minorities in Research Science (MIRS) presented their 2005 *Emerald Honors Award* to Dr. **Fern Hunt.** Hunt, a mathematician in the Mathematical and Computational Sciences Division, was selected as a Special Recognition Honoree in the 2005 awards. Presented at the conclusion of a three-day MIRS conference, the prestigious *Emerald Honors Awards* recognize stellar achievement in the research sciences by exceptionally talented minorities from a broad range of scientific fields. In addition to being recognized at the MIRS award ceremony and gala on September 17, 2005, at the Baltimore Convention Center, this year's award recipients will be featured in the September 2005 edition of *Science Spectrum* magazine.

The American Statistical Association presented the 2005 *W.J. Youden Award in Interlaboratory Testing* to **Hari Iyer**, Thomas Mathew and **Jack Wang** at the Joint Statistical Meetings in Minneapolis, Minnesota, August 7–11, 2005. Wang is a mathematical statistician in the Statistical Engineering Division in Boulder; Iyer, of the Department of Statistics, Colorado State University, holds a faculty appointment in ITL; and Mathew is a professor at the University of Maryland, Baltimore County.

Iyer, Wang and Mathew were recognized for their paper, *Models and Confidence Intervals for True Values in Interlaboratory Trials*, **Journal of the American Statistical Association**, Vol. 99, 1060-1071, 2004. The paper considers various models for data from an interlaboratory trial and develops confidence-interval procedures for the consensus mean based on the principle of fiducial inference. The procedures are particularly attractive since there is no requirement that samples be large for the procedures to perform adequately.

The award was established in 1985 to recognize publications that make outstanding contributions to the design and/or analysis of interlaboratory tests, or describe ingenious approaches to experimental planning and the evaluation of data from such tests. The award honors NBS Alumnus William John (Jack) Youden (at NBS 1948–1965), who helped establish the Statistical Engineering Division and made significant contributions to mathematical statistics, especially experiment design. Among his contributions was the invention of new families of statistical designs, including a class of designs known as the Youden Square.

The NIST Chapter of Sigma Xi recognized **David Kelley** of the Metallurgy Division with an award for *Outstanding Service in Support of Research Scientists*. The award was presented at the annual Sigma Xi banquet in May. Its citation read, "For excellent and long-standing contributions to the scientific research at NIST and support provided to the scientists and for excellence in sample electrodeposition."

Laurie E. Locascio of the Analytical Chemistry Division was recently elected to become Chair of the Division of Analytical Chemistry (DAC) of the American Chemical Society (ACS). The DAC has nearly 10,700 members, making it the second largest of 33 Divisions within the ACS. Dr. Locascio will serve as the Chair-Elect for the Division until October 2006.

Charles Majkrzak, a physicist of the NIST Center for Neutron Research, was recognized with the *Bertram E. Warren Diffraction Physics Award* from the American Crystallographic Association (ACA), "For his contributions to the development

of advanced instrumentation for neutron reflectometry, the formalism for polarized neutron reflectometry, and important new methods of data analysis." The award is granted every third year and accompanied by a monetary award of $1,500, up to $1,500 travel expenses to accept the award at Annual Meeting and a certificate. Majkrzak will accept his award at the 2006 ACA meeting in Honolulu.

Science Spectrum magazine will recognize **Willie E. May** of the Chemical Science and Technology Laboratory Office with its *Minorities in Research Science, Emerald Honors Special Recognition Award* at the 2005 Science Spectrum Magazine Conference on Minorities in Research Science in Baltimore, MD on September 17, 2005 for his exemplary performance in the area of research science.

On September 12, 2005 **Michael Moldover**, and colleagues **Eric May**, **Laurent Pitre**, **James Mehl** and **James Schmidt**, will receive the 2005 CSTL Technical Achievement Award for the development of quasi-spherical cavity resonators for both primary temperature and primary pressure metrology.

Dr. **Shashi Phoha**, Director of the Information Technology Laboratory, received the 2004 *Technical Achievement Award* from the IEEE Computer Society. The award recognized Dr. Phoha "….for pioneering developments of distributed automation for hierarchical control of interacting machines into dynamic reasoning systems." The *Technical Achievement Award* is presented to individuals whose professional work has been outstanding and innovative in the fields of computer and information science and engineering within the past fifteen years. The IEEE Computer Society will present the certificate to Dr. Phoha at an awards ceremony on November 3, 2005, in Philadelphia.

—Edgar Etz

6. BOULDER BABBLE

The Local Scene

July is our 'dog month', usually the hottest of the year, when everybody gives some attention to avoiding the discomfort of heat and people rarely do anything outrageous or amusing. By the standards of the South and East, our discomfort is very mild. The temperature sometimes gets above 100 degrees F, but the humidity is low and the nights are 30 or 40 degrees cooler, so many homes do not have air conditioning. And we can always find temporary relief in the mountains close by. As a consequence of the dry heat, July is also the start of the forest fire season, and we have already had one major fire and several smaller ones. August usually brings the start of the cooling trend that leads into autumn, and it is raining even now as I write.

The President of the University of Colorado, Elizabeth Hoffman, has resigned under pressure driven by the scandals associated with the recruiting practices of the football team and the inflammatory public statements of Professor Ward Churchill. Her temporary replacement is Hank Brown, who followed a very successful political career, in which he served in the Colorado State Senate, the U.S. House of Representatives and the U.S. Senate, by being appointed President of the University of Northern Colorado. He had been a very popular politician, and immediately demonstrated his political skill by eliminating ten staff positions in the president's office (several of which were vacant) and banning the use of State funds to purchase alcohol for University functions, thereby making token responses to the University's chronic budget problems and its reputation as a party school. The University is in moderate trouble, and we all wish him success in leading it to better times.

A New Entrance to NIST

The main entrance to the NIST/NOAA campus in Boulder is in process of being moved to a new location a few hundred meters south of its present one in order to divert the traffic on the site away from the Radio Building. What used to be a side entrance with limited access ("right in - right out") is being upgraded with a fancy new guardhouse and parking area, which are pretty well complete, and a full connection to Broadway with traffic lights, which is under construction now. Presumably this will be integrated into The Fence, if and when that is built.

Exquisitely Stable Lasers

Many years ago, in the late 1960s, Dick Barger and Jan Hall established the supremacy of the laser as a measuring tool. They demonstrated the stabilization of the frequency of a helium-neon laser by locking it to an absorption line in the vibration-rotation spectrum of methane, and clinched the matter by joining with a group of researchers led by Ken Evenson to measure the frequency and wavelength of that same absorption line in an effort to measure the speed of light. That work demonstrated the obsolescence of the krypton-87 length standard and led to a new international definition of the meter.

In the intervening years both Dick Barger and Ken Evenson have died after very successful careers, but Jan Hall has kept on creating refinements to laser science. He has retired from NIST, but retains his fellowship of JILA (formerly an acronym that meant "Joint Institute for Laboratory Astrophysics") and a lab in the JILA building on the University of Colorado campus, in which he works with his colleagues Mark Notcutt, Long-Sheng Ma and Jun Ye. Their latest product is an elegant refinement of the design of lasers that drastically reduces their sensitivity to vibration, based on an idea that Mark published several years ago.

The basic advantage that the laser brings to metrology is its intrinsically very narrow spectral linewidth, but in practice this is degraded by vibration of the mirrors forming its resonant cavity, and requires elaborate measures to restore it. The

(continued on next page)

original Barger and Hall experiment was performed in a vault, on an optical bench weighing 3 tons, and more recent work has resorted to electronic cancellation of vibration. Some time ago Mark Notcutt pointed out that the only mode of vibration that matters is relative motion of the two mirrors, and a perfectly symmetrical mounting should move the two mirrors equally and therefore remove the problem. So they mounted a cavity in a vertical position, attached to the mounting at its approximate midpoint, excited it with a little light split off from the laser beam and used it to generate an error signal that could be used to control the position of the primary mirrors of the laser by a servo mechanism. They did indeed observe the expected cancellation of vibration after trimming the mount by adding small weights to the upper mirror to compensate for imperfect placement. With this very simple arrangement they were able to bring the linewidth down to approximately 1 Hz and consider the vibration problem to be solved.

Death of Howard Garcia

We mourn the death of our colleague Howard Garcia, a fellow alumnus of DoC in Boulder. Howard worked in the Space Environment Lab, which monitors the activity of the Sun to give warning of solar storms to those who might be affected by them (telecommunications systems, power grids, space craft, etc.). He came to Boulder in 1976 (after that unit was detached from NBS). He was an avid mountaineer, cyclist and runner, and he died by drowning during the swimming phase of a triathlon race. He was 76 years old.

The Writing on the Wall

As the years go by, I am getting out of touch with NIST. Many of my old friends and colleagues have retired and many of the younger people who replaced them have too many calls on their time to waste it indulging an old man's curiosity, so it is getting to the point that I cannot honestly claim to be reporting what is going on out here—I give you only a random sample that I happen to hear about. Therefore I am looking for somebody who retired more recently to take over from me. I have promise of two good items for next time that I must not report just now for fear of interfering with publication, so I probably will write my December column, but after that things are looking doubtful.

—Bob Kamper

7. NECROLOGY

David Powley DeWitt, 71, a retired Purdue University professor and a NBS/NIST physical scientist most recently in the Optical Technology Division, died on May 17, 2005 at his home in Edgewater, MD, of complications from primary amyloidosis.

Dr. DeWitt was born in Bethlehem, PA, and graduated from Duke University in 1955 with a B.S. in mechanical engineering. He received his M.S. in heat and mass transfer/thermodynamics from the Massachusetts Institute of Technology in 1957 and his Ph.D. in mechanical engineering from Purdue University in 1963.

He first came to NBS in 1963 as a physicist in the Metallic Building Materials Section of the Building Research Division but he soon left to return to Purdue University where he held the positions of Deputy Director of the Thermophysical Properties Research Center (1965-1972), Associate Professor (1972-1978), and Professor of Mechanical Engineering (1978-2000). He worked on measurement methods in support of thermal control space applications. In 2000 he fully retired from Purdue University and received emeritus professor status.

Dr. DeWitt, an expert on heat transfer, returned to NIST in 1996 on a faculty appointment. He was instrumental in helping to organize the NIST Radiation Thermometry Short Course, which has been held annually since 1997. For the short course, he created many of the visual aids for the first set of lectures and consulted with the other NIST staff on how to set up the hands-on experiments.ºHe also served on the panel and presented one lecture.

In the Optical Technology Division of the Physics Laboratory, Dr. DeWitt was the leader of the Rapid Thermal Processing (RTP) temperature-sensing project. Working with the Office of Microelectronics Programs, he coordinated the collaborative effort between the Optical Technology Division (PL) and the Process Measurements Division (CSTL) to achieve temperature accuracies of better than ± 2 K at 1000 K in the RTP test bed. Using a multi-faceted approach, he guided the group to improve accuracies in using thin-film thermocouple technology and lightpipe radiation-thermometer calibrations by employing optical-property and radiation modeling and to liaise with industrial partners in the Common Interest Group (CIG) meeting each year. The goal was met within the eight years of this project. Dr. DeWitt was responsible for convincing the RTP community that traceability to a national standard at NIST and absolute accuracy were necessary to their interests.

He also chaired a committee at NIST to work with the heat-flow industry in resolving measurement discrepancies. He worked with industry representatives and NIST staff by moderating effective working group meetings to solve the problems, assigning tasks and pushing for the resolution of the discrepancies.

He worked on various other projects dealing with radiation thermometry and heat transfer problems. DeWitt retired in 2004.

He did a great deal during the short time he was in the Optical Technology Division. He will always be remembered as a leader in his field here at NIST and throughout the world.

His first wife, Joanne Meilicke DeWitt, died in 1990. Survivors include his wife of seven years, Phyllis W. Stonebrook of Edgewater, MD; three children from the first marriage: Karen Frederick of San Jose, CA, Amy Bifano of Chatham, IL, and Deborah Foley of Stafford, VA; a sister; and eight grandchildren.

Sources: NIST Archives, Benjamin Tsai (Optical Technology Division) and *The Washington Post*, June 1, 2005.

Natalie Joyce Goldenberg, 93, a former NBS librarian and an actress in community theater, died on June 6, 2005 at the Scandinavian Home in Cranston, RI, of a heart ailment.

Mrs. Goldenberg was born in Chicago and attended the University of Chicago, where she appeared in a number of productions including the 1931 world premier of Thornton Wilder's "Queens of France," which the playwright directed. After college, she worked at several social agencies in Chicago as an office manager. From 1947 to 1957 she lived in Paris with her husband, a diplomat.

In 1960, Mrs. Goldenberg started work in the library at NBS, where she was a translator and librarian until 1967.

She appeared in more than 80 community theater productions over the years in Chicago, Paris, Germany and Washington. She participated in radio dramatizations, directed children's plays, taught drama classes and provided English language dubbing for foreign films. She was also a volunteer tutor and reader for the blind and ushered at Arena Stage until she was 85. She played tennis into her early seventies. Goldenberg moved to Rhode Island in 1996.

Her husband Leon died in 1958. A daughter, Judith Iris Goldenberg, died in 1996. Survivors include her son, David of Cranston, RI; two sisters; two grandchildren; and three great-grandchildren.

Sources: NIST Archives and *The Washington Post*, June 12, 2005.

William Bernard "Bus" Knight, 98, a former NBS chemist in the Organic and Fibrous Materials Division and an examiner and lawyer with the U.S. Patent Office, died on May 13, 2005, peacefully in the presence of family at Inova Alexandria Hospital after a stroke.

Born on February 7, 1907 in Alexandria, VA, he graduated from Alexandria High School and worked his way through the University of Virginia by waiting tables, washing dishes, and playing the violin in dance bands. He played freshman basketball and lettered in track and cross-country. He also was student president of the Department of Education and was a member of the Varsity Club and Theta Delta Chi fraternity. He graduated from the university in 1929 with a bachelor's degree in education with an emphasis on chemistry. After graduation, he taught mathematics and science for two years at Lee Jackson High School in Fairfax County, and then served as principal of Fairfax City Elementary School for one year.

From 1930 to 1933, Mr. Knight worked in the Organic and Fibrous Materials Division of NBS, first in the Rubber Section and later in the Leather Section.

He became a Patent Examiner with the U. S. Patent Office in the mid-1930s, and studied law at night, receiving a J.D. from Washington College of Law (now part of American University) in 1941. He lived in Richmond, VA from 1942 to 1946 when the Patent Office was moved there temporarily during World War II. At the time of his retirement in 1972, he was the Director of Examination for Chemical Engineering and Specialized Chemical Industries.

He had maintained a second home near White Stone in Virginia's Northern Neck since 1963. He was a sailing enthusiast and a ham radio operator. He received his first amateur-radio license in 1923. On February 12 of this year, Mr. Knight was recognized during a half-time celebration of the 100th anniversary of U VA's basketball team. He was thought to be the university's oldest living former athlete.

He was a member of Immanuel Church-on-the-Hill, an Episcopal church in Alexandria, for 58 years, and served on the church vestry and as junior warden.

His wife of 66 years, Vernie Blankinship Knight, died in 2003. He is survived by a daughter, Edna K. Roberts of Alexandria and White Stone; a son, John L. of Richmond; and four grandchildren.

Sources: NIST Archives and *The Washington Post,* May 18, 2005.

Neil Thorvald Larsen, 72, a physicist with the Electromagnetics Division died May 12, 2005 in Boulder, CO.

Larsen was born June 5, 1932 in Cheyenne, WY. As a civil engineer for the U.S. Bureau of Reclamation, Mr. Larsen's father moved his family often throughout the western U.S. during his childhood, giving him a deep appreciation and fondness for the West.

He graduated in 1953 from the University of Colorado (CU), Boulder, with a degree in Engineering Physics. For the next three years, he served as a commissioned officer in Washington, DC for the Department of the Navy, where he was assigned to the Naval Aviation Electronics Service Unit. He was a technical writer, a Technical Reports Analysis Officer and an instructor for courses in radar technology, missiles and related topics.

After completing post-graduate work at CU, he spent the remainder of his career as a physicist in Boulder for the National Bureau of Standards.

Although very modest about his achievements, Mr. Larsen was widely recognized for major contributions to microwave-power metrology. He designed a control system for the basic standard for microwave power that won NBS a position of world leadership in microwave measurements. He developed

(continued on next page)

a microwave power meter that was considerably more accurate and less expensive than previous ones, and that became widely used in metrology labs in the Department of Defense, the aerospace industry and NIST itself. He also developed an innovative microwave power meter that significantly improved the performance of satellite communication ground stations.

Larsen designed highly sensitive listening devices that were used to detect enemy movements on land and sea during the Vietnam and Cold War conflicts, and are now used to detect the movements of orcas and other sea life in the North Pacific.

For his accomplishments, Mr. Larsen received a number of patents and awards, including the *Silver Medal Award* from the U.S. Department of Commerce (1978) and the *Automated Measurements Career Award* from the Institute of Electrical and Electronics Engineers (IEEE) in 1996. He was a member of the IEEE, the American Association for the Advancement of Science, Sigma Xi Scientific Research Society, the Flatirons Mineral Club and the Old Crows Society.

In 1958, he married fellow student Ruth Crissey and in 1960 settled in Broomfield, CO, where he and Ruth had two children: Chris and Anne. The Larsens became active members of the Lutheran Church of Hope in Broomfield, with Mr. Larsen acting in various leadership positions, including Treasurer.

After the end of his first marriage in 1970, Mr. Larsen moved to Boulder, where he remained for the rest of his life. In 1972 he married Joyce Nixon, a businesswoman and community-college teacher whom he had met during his Navy service in Washington.

Mr. Larsen is remembered by his family, colleagues and friends as a very analytical and brilliant man caught up in the wonders of physics, music, mathematics, lapidary science, electronics, computers and cats. His musical focus rested primarily on Baroque composers (especially Bach), organ music, and opera. A voracious reader, Larsen read widely in the science-fiction and fantasy genres. His often-whimsical sense of humor expressed itself in his great fondness for cartoon art, especially Walt Kelly's *Pogo* and Bill Watterson's *Calvin and Hobbes*. His scientific and artistic temperaments were joined in his handcrafted jewelry and avid interest in gems and minerals.

He is survived by his wife JoyceLarsen ; his son Chris, 44, of West Chester, Pa.; his daughter Anne Hollerbach, 41, of Franklin, MA; his sister Connie Mallette of Tucson, AZ; and his grandsons Ricardo (16) and Raul (13), sons of Chris.

Sources: Chris Larsen and *The Boulder Camera*.

Yolanda M. Morosko, 86, a former administrative assistant in the Institute of Basic Standards, died on July 10, 2005 at her home in Hagerstown, MD.

Born on January 28, 1919 in North Braddock, PA, she graduated from McKeesport High School and Allegheny Business College.

She joined NBS in 1960 as a secretary to Dr. A. T. McPherson, Associate Director for Engineering, in the Office of the Director and moved with him to the newly formed Institute of Applied Technology in 1964. After the move to Gaithersburg, she worked in the Textile and Apparel Technology Center of the Office of Engineering Standards, the Applied Acoustics and Illumination Section of the Building Research Division and Applied Acoustics in the Office of the Director, IBS. She retired from NBS in 1978.

She was a member of Zion Evangelical Lutheran Church, Williamsport, MD.

She was predeceased by one sister, Dorothy Kees, and one brother, William.

She is survived by two nieces; four great-nieces and a great-nephew; two great-great-nieces and a great-great-nephew, all of Hagerstown.

Sources: NIST Archives and *The Herald-Mail Newspapers*, Hagerstown, MD, July 12, 2005.

Priscilla Jencks Schuhmann*, 83, a former NBS chemist, died on May 16, 2005 at Byron House in Potomac, MD of kidney disease.

A resident of Bethesda, MD for over 50 years, Mrs. Schuhmann was born in Port Arthur, TX, but her roots were in New England, where her ancestors were early settlers. Her father was an engineer and was working on a project in Texas at the time of her birth. She spent most of her childhood in Littleton, NH, and graduated with a bachelor's degree in chemistry from Smith College in Massachusetts in 1943.

She then moved to Washington to work at NBS as an analytical chemist in the pH Standards section of the Chemistry Division. She married in 1946 and left NBS the following year to raise her family.

Mrs. Schuhmann returned to work in the mid-1960s, when she took a position in the chemistry department of the University of Maryland. There she worked with Dr. Cyril Ponnamperuma, a noted authority on the chemical origins of life, in the Laboratory of Chemical Evolution. They studied the formation of biological building blocks from the interaction of electrical arcs with the gases thought to have existed in the primordial atmosphere.

After working briefly at Goddard Space Flight Center in Greenbelt, MD in the mid-1970's, she moved to the Department of Agriculture in Beltsville, MD and concluded her career as a chemist analyzing breakfast cereals and other groceries for sugar content. She retired in 1987.

Her husband of 58 years, Shuford*, also a NBS chemist, died in 2004, soon after their move to Potomac. Survivors include three children: Dr. Deborah J. and Jeremy S., both of Bethesda, and Dr. Reinhardt B. of Brookhaven, N.Y.; two sisters; and three grandchildren.

Sources: NIST Archives and *The Washington Post*, June 1, 2005.

Albert Weiss, 93, a former member of the NBS Ordnance Development Division, died on June 1, 2005 in Salem, OR, where he resided, after living a long and interesting life.

He was born in New York City on February 5, 1912.

Weiss trained as an electronics engineer and joined NBS in

1942, working in various sections of the Ordnance Development Division until 1949 when he moved to the Atomic and Molecular Physics Office. After 1950 he had assignments with the Naval Ordnance Laboratory, Norco and Point Magoo, CA, where he worked on missile programs.

His hobbies included ham radio (K6VU and W6UGA) and he was known as a Master Chess Player around the world.

Albert will be remembered most for his uniqueness and high intelligence, generosity, devoted love and dedication to do the best for his family and pets. Weiss also loved traveling—he, his family and their French poodle, Lublu drove throughout Europe for an entire year, living with different European families. He also loved the ocean, a good view, reading, Chinese food and his wife's cooking.

His wife Mildred died in 1997. He is survived by a son, Joel, of Minneapolis, MN and a daughter, Joann Watling, of Stony Brook, NY.

Sources: Joann Watling and NIST Archives

We recently learned of the passing on August 19, 2005 of Barbara J. Greenough*, who worked at NBS for four years in the late 1940s. In addition Robert T. Howell, a personnel specialist at NBS in the 1950s, died on September 3. More complete obituaries will appear in the December SAA Newsletter.

In addition, we consider it appropriate to report the death of the spouse of a former NBS employee and father of a present NIST employee; Gaspar Messina, 77, husband of Carla G. Messina*, died on June 4, 2005 at Washington Adventist Hospital in Takoma Park, MD. Carla worked with Joseph Hilsenrath in the Equation of State Section of the Heat Division and she contributed greatly to the development of *OMNITAB*. Their son, John, is a member of the Semiconductor Electronics Division.

Finally, we report the passing on August 23 of Joseph V. Natrella*—widower of Mary G. Natrella, a noted NBS statistician who died in 1988.

—Rosemary MacDonald

* Indicates SAA member

8. NEWS OF ALUMNI

Scientist Emeritus Dr. Marilyn Jacox Honored

Dr. Marilyn Jacox, Scientist Emeritus in the Optical Technology Division of the Physics Laboratory, is the recipient of the 2005 George C. Pimentel Award for Advances in Matrix Isolation Spectroscopy. The award is presented by the Organizing Committee of MATRIX 2005 and the Association of the Matrix-Isolation World Community to recognize outstanding contributions to matrix-isolation spectroscopy. This year the prize was presented at the MATRIX-2005 Conference on the Physics and Chemistry of Matrix Isolated Species held at the end of July in Funchal, Portugal. The prize is awarded every two years and includes a certificate, together with a monetary prize of 1500 €. Dr. Jacox has made many major contributions to matrix-isolation spectroscopy—most recently investigations of highly unstable negative ions and negative-ion clusters. A scientific biography highlighting Dr. Jacox's seminal research in this field introduces a special issue of the Journal of Physical Chemistry (April 27, 2000).

Life after NIST—An Adventure in Retirement

As you read this, I will be approaching the six-year anniversary of my retirement from NIST. I started at NIST in 1972 as a summer student and retired at the age of 49, 27 years later, not knowing what the future would bring. What I found was that my experience at NIST was excellent preparation for what lay ahead. The wealth of opportunities that I had in research and management in the NIST labs, the Program Office, the ATP, as a committee chair in the National Science and Technology Council (NSTC) and in volunteer NIST organizations such as the Standards Committee for Women and the NIST Child Care Association all provided valuable training and experience that led to great retirement adventures.

Although I never intended to leave the state of Maryland, in six months I found myself on the way to Richland, WA to be Director of the Pacific Northwest National Laboratory (PNNL), a DoE science lab run by Battelle. It was an extraordinary experience in many ways and I came to love the lab and its people, the community and the Northwest. The move was positive for the whole family, so, when I left after three years because I tired of traveling two-thirds of the time, we decided to stay.

A week after I left PNNL, the Governor's science advisor called and asked if I would co-chair the development of a bioscience initiative for the state. It took two years and a lot of work, but we developed a plan that was broadly supported by the research institutions, industry and other stakeholders. The plan—focused on predictive, preventive medicine—was introduced to the legislature by our new Governor, Christine Gregoire, this spring as the Life Sciences Discovery Fund (LSDF), one of her top three initiatives. The legislation was

(continued on next page)

passed in April and will provide more than $1 billion in research support ($350M in tobacco funds leveraged more than 2:1 with non-state funds) to make Washington State a leader in 21st century medicine. In June, I was honored when the Governor appointed me as the first Chair of the Board of the LSDF. My NIST experience has proven valuable during the development and now the implementation this new program.

In January 2004, I agreed to lead the restart of a medical-imaging company, Advanced Imaging Technologies, which has a revolutionary technology for doing soft-tissue imaging called Holographic Ultrasound (HU). HU utilizes a transmitted wave of ultrasound, combined with holography, to gather detailed real-time images of the body segment being examined. The diffractive properties of sound waves as they passed through soft-tissue structures produce high-contrast, highly detailed images that combine the features of many competing imaging modalities and deliver them in a single, safe solution. What attracted me to AIT was both the innovative nature of the technology and the fact that it has a broad platform of applications, something I came to appreciate in ATP. We are placing our first commercial unit, which is designed for early detection of breast cancer, in a regional medical center in September.

While it has been an exciting six years, I look forward to winding down and transitioning towards a slower-paced, more relaxing "true" retirement. The kids claim that I will never retire—but I intend to prove them wrong!!

—Lura Powell

9. BIRTHDAYS OF ALUMNI 75 OR OLDER

October 2005

Bagg, Elizabeth M. 28/1917
Cohen, Robert 15/1924
Cushen, Helen 19/1925
Elbourn, Robert D. 5/1919
Evans, John P. 6/1925
Fatiadi, Alexander J. 22/1922
Flynn, Joseph H. 28/1922
Galowin, Lawrence S. 8/1924
Gross, Daniel 28/1928
Hudson, Ralph P. 14/1924
Lloyd, Iris M. 16/1919
MacDonald, Rosemary A. 7/1930
Matwey, Gerry 25/1920
Mitler, Henri 26/1930
Rebbert, Richard E. 1/1927
Shultz, James I. 23/1919
Tucker, Jean O. 5/1923
Weber, Alfons 8/1927

November 2005

Allen, Jr., Harry C. 26/1920
Alt, Franz L. 30/1910
Ambler, Ernest 20/1923
Butters, James W. 9/1925
Carter, Robert S. 15/1925
Caswell, Jean M. 3/1924
Horowitz, Diane 26/1928
Johannesen, Rolf B. 3/1924
Leight, Walter G. 19/1922
Little, C. Gordon 4/1924
Lyons, John W. 5/1930
Martin, William C. 27/1929
McCoubrey, Edna 21/1921
McKinney, Ursula 17/1925
Meijer, Paul H. 14/1921
Prince, Edward 29/1928
Rebbert, Alicia C. 27/1926
Scace, Robert I. 11/1927
Tucker, Clyde D. 15/1922
Weiser, Sidney 17/1919

December

Bozman, William R. 21/1920
Brown, James E.T. 5/1930
Brungraber, Robert J. 20/1929
Conway, Richard S. 20/1930
Franklin, Alan D. 10/1922
Greenough, M. Leighton 30/1918
Harman, George G. 7/1924
Howell, Barbara 18/1924
Kirby, Richard C. 13/1922
Klein, Suzette 7/1927
Kotter, F. Ralph 8/1915
Oser, Hans J. 7/1929
Reneker, Darrell H. 5/1929
Sadowski, Walter L. 30/1929
Stern, Kurt H. 26/1926
Toense, Earle R. 1/1923
Toense, Jr., Raymond A. 1/1923
Wright, Blanca G. 22/1921

10. ASSOCIATION NEWS

NIST Portrait Gallery Ceremony

This past March, the jury selected ten honorees for induction to the NIST Gallery of Distinguished Scientists, Engineers and Administrators. The yearly portrait-hanging ceremony is planned for the morning of Friday, November 4, to begin at 10:30 AM. During the ceremony, OU Directors will take turns presenting each of the honorees, and the honorees will be invited to give a brief response. The ceremony will be preceded by a breakfast reception, where friends can come and congratulate honorees and families, and will be followed by the viewing of the portraits. Please mark date and time on your calendar. The names of this year's honorees are:

Geoffrey Frohnsdorff
Tom Gary
Jan Hall
William Haynes
Takashi Kashiwagi
Sharon Lias
Rosalie Ruegg
Miles Smid
Jack Snell
Wolfgang Wiese

—Anneke Sengers

Highlights of the SAA Board of Directors Meetings

May 4, 2004:

SAA President Jerry Kruger noted that Philip Bond, Under Secretary for Technology, left DoC recently for a new position. His departure message referred to NIST as the Technology Administration's "Crown Jewel."

Hans Oser reported that the current SAA membership was approximately 440 people.

Treasurer Jim Hormuth's report consisted of routine expenses and dues income. The cost of publishing and distributing the newsletter (approximately $4000 per year) is the SAA's major expense by far.

Dick Wright was asked by the Board to draft a letter to Acting Director Semerjian to seek his guidance on whether it was appropriate to consider non-NIST employees for inclusion in the portrait gallery (e.g., guest researchers or CARB staff who had made important contributions). The CRADA between NIST and SAA does not address this issue. Noel Raufaste is preparing the list of new selections for the portrait gallery. (see above)

Reeves Tilley thanked Noel Raufaste for arranging the July 14 SAA program on the World Trade Center.

Historian Jim Schooley reported that Bill Ott, who is responsible for the NIST colloquium program, liked the proposal for the SAA History Lecture series (a series intended to inform NIST people of significant events in NBS/NIST history). They both agreed that an excellent topic for a lecture later this year would be the NIST work on parity that led to the 1957 Nobel Prize. In addition to lectures on NBS/NIST history, Schooley proposes to develop and provide to NIST staff, brief but informative quarterly write-ups about various aspects of NIST history.

Reeves Tilley reported that former NBS Director Branscomb, whose first wife died several years ago, recently remarried. Rosemary McDonald reported that Joe Hilsenrath's wife died in April.

June 1, 2005:

SAA President Jerry Kruger has experienced health problems recently that have prevented his attendance at Board meetings. The Board conveyed to him its wishes for a speedy recovery.

SAA Treasurer Jim Hormuth reported that SAA membership now stands at 445. (The membership list was recently purged of names of those who have not paid their dues.) Total assets are roughly $35,000. Ticket sales for the Annual Dinner exceeded expenses by about $200.

Congratulations and welcome to Joseph Flynn, the newest SAA member.

The Portrait Gallery Committee (contact: Anneke Levelt Sengers) is gearing up for this year's induction ceremony. SAA proposes to seek a written charter for the portrait gallery from the NIST Director. Some photographs originally in the gallery have been found, and will be re-hung in the near future.

The Program Committee (contact: Reeves Tilley) confirmed the July meeting topic—the World Trade Center final report. Suggestions for a speaker for the October meeting were discussed.

Jim Schooley is heading up an SAA effort to provide history bulletins to NIST employees. The SAA feels that it is important to instill in NIST people — especially new employees — a sense of the rich history of the Bureau/Institute. For example, every NIST employee should be familiar with the famous ADX-2 incident because it is the quintessential example of what this institution stands for. A number of suggestions were made for bulletin topics. SAA will also be working with NIST's Human Resources staff to provide history materials for presentation at new employee orientation sessions.

SAA's efforts to preserve oral history continue. An oral history with Peter Heydemann was recently completed. Tom Gary will be the next interviewee.

July 6, 2005:

Vice President Dick Wright ran the meeting because President Jerry Kruger's continuing health problems preventing him from attending.

Bill Koch had expressed concern to the SAA about Elio Passaglia's NBS history *A Unique Institution: The National Bureau of Standards, 1950-1969* because it had not adequately treated radiation research. It is unclear how this oversight occurred. Hans Oser has been pursuing a solution, and has obtained three contributions that address this deficiency—from Bill Koch, Louis Costrell and John Hubbell. He has been discussing with WERB whether these contributions might be published as a NIST Special Publication or perhaps in the NIST Journal of Research. The Board mentioned other people involved in radiation research (e.g. Jim Leiss and Randy Caswell) who might also be able to contribute material.

Membership Chair, Betty King, reported that Barbara Levin and Miles Smid joined SAA.

Noel Raufaste reported that the Portrait Committee has notified the ten 2005 honorees and is preparing the bio sketches for the booklet for this year's ceremony, which will take place November 4.

Reeves Tilley mentioned that the World War II "Bat" missile (NBS took a leading role in its design and development) is now on display at the National Air and Space Museum's Steven F. Udvar-Hazy Center near Dulles Airport.

Historian Jim Schooley reported that the NIST people with whom he has discussed the NBS/NIST history lecture series have all been enthusiastic. Schooley is soliciting stories for possible lectures or history write-ups, and would prefer that they be first-hand accounts. Russell Kirsch expressed disappointment to SAA that the SEAC computer and NBS' contributions to early computer development have not been adequately recognized by the public. Brian Belanger suggested that maybe the History Channel could be talked into doing a program about it.

NIST is interested in having SAA help with new employee

(continued on next page)

orientations by exposing new employees to key facts about institutional history. Dick Wright, Jim Schooley and Hans Oser met with Sandy Heydemann, who is responsible for the orientations. A 1.5-day orientation is offered every other Monday. It has been suggested that SAA might do a 15- to 20-minute presentation at these sessions. After a discussion of key points to include, the Board agreed that the ADX-2 incident would be particularly good to cover because it illustrates well the importance of scientific integrity in the NIST culture. Schooley will take the lead on this, but in order for it to work, there will need to be several volunteers willing to present this segment of the orientation so that the same person does not have to do it every other week throughout the year.

August 3, 2005:

The Board was happy to learn that President Jerry Kruger's injury is mending. He hopes to return to Board meetings beginning in September.

No new members joined during the past month, and the Treasurer's Report involved only minor expenses and income. The Board approved the purchase of upgraded database software for the SAA office computers.

The Board was saddened to learn that Newsletter Compositor Leighton Greenough's wife Barbara is gravely ill and is currently in hospice care.

Anneke Sengers reported that the bio sketches of the ten 2005 portrait-gallery inductees are now nearly complete. No decision has been reached yet regarding the policy issue of whether distinguished individuals from CARB or JILA (as well as guest workers) might be candidates. It was suggested that the portrait gallery and bio sketches be put on the NIST web site.

Jacob Rabinow's personal papers have been turned over to the NIST library. The library would welcome volunteers to help with cataloging these papers and other archival material donated in recent years.

Jim Schooley has continued to work with Bill Ott to arrange the December 2 history colloquium on parity. They plan to invite the key people involved in that experiment to attend, and hope that most of them will be present for the event. Schooley also reported that the script for the new employee orientation history presentation has been drafted. He will be seeking SAA volunteers to make these presentations.

Walter Leight introduced Terry Wheeler, who was recently hired by the NIST library as Deputy Director. Among a number of other major responsibilities, she will be involved in archival matters.

—Brian Belanger

Bios of New SAA Directors

Edgar Etz retired in December 2004 after 37 years at NBS and NIST. He had come to NBS in 1967 while finishing his Ph.D. in chemistry at Clarkson College of Technology (now Clarkson University). At that time he worked in the Electrochemical Analysis Section (Analytical Chemistry Division) of Roger Bates. Following a year of post-doctoral studies at the University of Florida, Edgar returned to NBS for full-time employment in 1971. He was active in various areas of analytical chemistry throughout his career, up to his retirement from NIST. Early on, his work resulted in the issuance of several Standard Reference Materials (SRMs) for the determination of pH and the use of ion selective electrodes. In 1974, he transferred to the Microanalysis Research Group, then headed by Kurt F.J. Heinrich. Here he was part of the team that developed the NBS Raman microprobe, a new tool for obtaining molecular-compositional information in the microscopic domain. This development became the start of Etz's career-spanning involvement in all aspects of Raman microprobe spectroscopy. One major thrust of his work in this field has been the integration of analytical micro-Raman techniques with electron- and ion-beam probe techniques. Over the past five years, Edgar—as a staff member of the Surface and Microanalysis Science Division—has been involved with colleagues in developing standards for the analytical Raman community, resulting in three Raman SRMs being issued.

Edgar has been President of the NIST Chapter of Sigma Xi, served as President of the Microbeam Analysis Society (MAS) and was the North American Editor of Mikrochimica Acta. He continues to be a member of the American Chemical Society, the Society for Applied Spectroscopy and MAS. Starting with his retirement, Edgar took a volunteer research position at NIH, doing Raman and FT-IR spectroscopy in the biophysics lab of Ira Levin at the National Institute of Diabetes and Digestive and Kidney Diseases.

Noel Raufaste headed BFRL's Office of Cooperative Research Programs during 1972-1999 when he retired to become Managing Director of the American Society of Civil Engineers during 1999-2001. In 2002, Raufaste started a small consulting firm and he is an NIST Guest Researcher. Prior to joining NBS in 1972, Raufaste was an analysis at a Bethesda, MD consulting firm.

11. HISTORICAL ACTIVITIES

Nobel Laureate T. D. Lee scheduled for first SAA Historical Lecture

SAA hopes that a new tradition may begin this December. T. D. Lee, Professsor of Physics at Columbia University, who with his colleague C. N. Yang won the Nobel prize in physics in 1957, is scheduled to address the Friday morning staff colloquium on December 2nd. His subject, *New Insight into Old Problems*, will focus on the failure of parity conservation in weak nuclear interactions as well as some new ideas in nuclear physics. The topic should be of particular interest to NIST employees because the theoretical prediction of Lee and Yang was verified by an experiment performed at NBS in December, 1956. NBS scientists Ernest Ambler, Ray Hayward, Dale Hoppes and Ralph Hudson, collaborating with Madame C.S.Wu of Columbia University, overcame difficult experimental problems to demonstrate parity non-conservation in beta decay.

SAA will co-sponsor Lee's lecture with the NIST Staff Colloquium Series, administered by Bill Ott, deputy director of the NIST Physics Laboratory. Current plans call for an annual lecture on a topic of historical significance that involves NBS/NIST staff members.

—Jim Schooley

World Year of Physics 2005 Celebrated at NIST

The World Year of Physics 2005 (WYP 2005) is a worldwide event celebrating physics and the impact physics has on our everyday lives. The hope in celebrating WYP 2005 is to raise awareness of physics through the accomplishments of the past, impact of the present, and vision for the future. It is timed to coincide with the 100th anniversary of Albert Einstein's "Miraculous Year." In recognition of this important celebratory year, the Information Services Division (ISD) is creating new products and services focusing on the scientific activities of NIST physicists.

The Knowledge Innovation in Physics (KIP) Team was created early this year to lead the ISD effort to promote and celebrate the World Year of Physics 2005. ISD has created several new exhibits, has held and is planning for celebratory events, and launched a new page on the NIST Virtual Library (NVL). The current list of WYP exhibits and activities is provided in the table below.

The World Year of Physics 1905-2005 Webpage (http://isd-i.nist.gov/physics/) was created by the KIP team to feature NIST physics accomplishments as well as to capture NIST physicists' visions for the future. A main focus of the Webpage is to create a "virtual time capsule" for future generations. In it, NIST physicists will leave comments about their work and their hopes for physics research in the coming years. The information collected here will be stored in the NIST Archives until 2105. SAA members are invited to contribute their comments to the virtual time capsule.

Exhibit/Activity	Location/Date
Bureau of Standards, 1905 - Notable Personalities in Physics	Hall of Standards near the lobby of Bldg.101
Bureau of Standards, 1905 - Notable Publications	Museum lobby
WYP Banner	Above the Museum/Library entrance
Baseball exhibit	Outside the Museum/Library
WYP Web site including a virtual time capsule	http://isd-i.nist.gov/physics
ISD Open House	September 29, 2005
Poster describing the research from Bose-Einstein through the current research surrounding the Nobel awards	September 29, 2005

—Jo Ann Remshard, Information Services Div.

12. MEMBER COMMUNICATIONS

Dear SAA, Norman (Belecki), and Elizabeth (King),

I would appreciate it if you would update my information in the SAA Alumni Directory to reflect my retirement from DuPont Legal on August 1st.

Although it has been over 24 years since I retired from NBS in 1981, I still recognize dozens of former colleagues in each SAA Newsletter. I worked as a postdoc in the Polymers Division initially, and then as a research chemist, program analyst and manager, and finally as acting director of the programs, budget, and finance office. My opportunity to work with Ernie Ambler and Ray Kammer provided the education that led to law school and a subsequent career as an IP and commercial attorney with DuPont where I worked primarily in the life sciences area, including pharmaceuticals, agricultural biotechnology, the seeds and grain business, and Bio-Based Materials. I developed the shrink-wrap, patent label license used across the U.S. seed industry, obtained FDA approval with orphan drug status for the DuPont drug TREXAN, and defined the antitrust case DuPont litigated against Monsanto. Most recently I worked with the Bio-Based Materials business to develop and implement market strategies for regulated medical and dental products.

I hope to keep quite busy in retirement. This Fall I'll teach two courses at the Academy of Lifelong Learning on "Equal Protection: Living with the Law" and "The Great Voyages of

(continued on next page)

the Seafaring Explorers". I plan to continue work on minority group issues of Native Americans and the Maori, as well as teaching courses on literature. Susan and I have plans for travel and are looking forward to the arrival of a second grandchild due in October. My one year postdoc appointment at NBS has led to interesting places.

—Bruce Morrissey

13. MISCELLANY

National 'Innovation Summit' Being Planned For Fall

The following statement of U.S. Representative Frank Wolf is excerpted from a May 12, 2005 press conference announcing a National Conference on Science, Innovation and Manufacturing:

"Last week I met with a leading group of scientists and posed this question: Do you think we – the United States – are doing okay when it comes to science and innovation, are in a stall or are we in a decline?

"None said we were doing 'okay.' About 40 percent said we were in a stall and the remainder—60 percent—said we were in decline.

"I asked the executive board of a prominent high-tech association the same question on Tuesday. They all said we were in decline.

"Regardless of whether you categorize our current situation as a stall or decline, there is general agreement that America's dominance in science and innovation is slipping.

"Just look at three measuring sticks: patents awarded to American scientists; papers published by American scientists; and Nobel prizes won by American scientists. All three are down.

"That's why we worked to include language in the recently passed supplemental appropriations bill directing the Secretary of Commerce to work with groups like NAM, AeA, the Business Roundtable, the Council on Competitiveness and others to put on a national conference this fall in Washington to begin focusing like a laser beam on this issue…..

"Our hope is that the conference will bring together the nation's best and brightest to help develop a blueprint for the future of American science and innovation. It also will look at where there has been slippage and why, and what needs to be done to reverse the trend…."

December 6 has been chosen as the date and Washington, DC as the place for this conference to help develop a blueprint for American science and innovation. "The expectation is that we will be inviting between 50 and 75 top CEOs from U.S. companies to the day-long event," said a spokesperson for Rep. Vernon Ehlers (R-MI) who, as chairman of the House Science Subcommittee on Environment, Technology & Standards, has the lead role among lawmakers in planning the event. Discussion, at least part of which is expected to be open to the public, will cover actions the federal government might take in such areas as research and development, education, and workforce development in order "to ensure that U.S. innovative capacity continues to be strong and can improve," the spokesperson said. Involved in organizing the conference, under the coordination of the subcommittee staff, are the Department of Commerce, the National Association of Manufacturers, the American Electronics Association, the Council on Competitiveness, the Business Roundtable, George Mason University, and the Northern Virginia Technology Council.

The meeting, whose provisional designation is "Summit on Competitiveness and Innovation," is being funded in accordance with language that Wolf, who chairs the House Appropriations Subcommittee on Science, State, Justice & Commerce, placed in a supplemental appropriation passed earlier this year. It has received strong support from House Science Committee Chairman Sherwood Boehlert (R-NY) as well as from Ehlers.

Source: *Manufacturing & Technology News*, August 2005 and <http://www.amt-mep.org/news/05-09.pdf>

May 20—World Metrology Day†

This remembrance of the signing of the Treaty of the Meter is widely celebrated abroad, especially in the European and the Asia-Pacific metrology communities. After attending the 2000 Conference on Precision Electromagnetic measurements, held in Sydney from May 15–19, I had the good fortune to attend a CIPM luncheon held at the Sydney Observatory in celebration of World Metrology Day. This was my first exposure to this special day and the beginning of my wonder that it is not widely celebrated, or even known-of, in the U.S. metrology community. Celebrating it seems like a wonderful way to introduce the general public to the infrastructure that supports measurement accuracy in the U.S.

The following is a World Metrology Day proclamation by the Director of BIPM, Andrew Wallard:

"On 20 May 1875, 17 States became the founding Members of the Metre Convention. The Convention is the second oldest intergovernmental treaty arrangement and set the scene for what is now 130 years of achievement and success in the establishment of a global infrastructure for precise, accurate and traceable measurement. Today there are 51 Members of the Convention and 17 Associate States and Economies of the General Conference on Weights and Measures. The first members of the Convention and the staff of the Bureau International des Poids et Mesures (BIPM) started with the metre and the kilogram as reference standards. However the work

of the Convention now extends to a much greater number of international measurement standards and is making its presence felt in fields as diverse as biological standards and nanotechnologies.

"We celebrate the 20th May as a day on which metrologists can be proud of their quiet, largely unseen, but influential achievements. They can look back on a successful past, and look forward to another 130 or more years of service to the scientific, technical, commercial, and social applications of precise, traceable measurements within the International System of units (SI).

"This message from the BIPM, which is at the heart of world metrology, is a challenge to, as well as recognition of, the immense contributions of many thousands of metrologists throughout the world. It also aims at drawing the attention of Governments from our Member States and others, as well as international bodies, to the benefits of good metrology and the very large economic benefits which come from their investments. Many studies have shown a clear and very large techno-economic benefit from public investments in metrology. One recent UK study put the return from their £40 million national investment at over £5000 million! Similar figures apply to economies of all sizes and stages of economic development. The benefits of metrology touch us all, wherever we live and whatever we do."

—Norm Belecki

† This item would have appeared in the June issue had there been adequate space.

14. CHANGES TO THE DIRECTORY

New Members

Wheeler, Terrie
18618 CHICADEE LN
GAITHERSBURG MD 20879
Htel: (301) 963-5987
Wtel: (301) 975-3772
Email: terrie.wheeler@nist.gov

Lee, Robert
1 LOCUSTWOOD CT
SILVER SPRING MD 20905-6420
Htel: (301) 236-5859

Changes to existing entries

Creitz, Elmer C.
Dropped membership

Johannesen, Rolf B
3114 GRACEFIELD RD / APT 215
SILVER SPRING MD 20904-7854
Htel: (301) 586-8521

Morrissey, Bruce W.
3302 COACHMAN RD
WILMINGTON DE 19803-1905
Htel: (302) 478-3549
Email: bruce.morrissey2@verizon.net

Richards, Esther S.
3200 BAKER DR / APT HC14
ADAMSTOWN MD 21710-9653

Toense, Earle R.
15308 HANNANS WAY
ROCKVILLE MD 20853-1816
Htel: (301) 929-3257
Email: emtoense@comcast.net

Urrutia, Jorge R
9604 NAPOLEON WAY
MONTGOMERY VLG MD 20886-3147
Htel: (240) 793-6379
Fax No: (301) 926-7203
Email: urruagui@msn.com

15. ASSOCIATION OFFICERS AND COMMITTEE CHAIRMEN 2005-2006

President	Jerome Kruger	301-762-5291	jk2727@aol.com
Vice Presidents	Walter G. Leight	301-975-4010	walter.leight@nist.gov
	Richard N. Wright	301-977-9049	richard.n.wright@verizon.net
Directors	Brian A. Belanger	301-258-0708	bcbelanger@aol.com
	Edgar Etz	301-972-1583	edgaretz@aol.com
	Albert C. Parr	301-977-7652	parr@comcast.net
	Noel J. Raufaste	301-949-4298	nraufaste@erols.com
Senior Operations Officer	Hans J. Oser	301-299-7818	hansoser@comcast.net
Treasurer	James A. Hormuth	301-926-7833	jahrah@earthlink.net
Recording Secretary	Geoffrey Frohnsdorff	301-926-2232	frohns@erols.com
Auditor	Bob Martin	301-662-0056	Martinrobertf@aol.com
Past President	David R. Lide	301-424-1009	drlide@post.harvard.edu
Program Chairman & SAA/NIST Associate	W. Reeves Tilley	301-762-7186	wreevestilley42@comcast.net
Newsletter Editor	Norman Belecki	301-869-4520	n.belecki@ieee.org
Associate Editor	Ralph P. Hudson	301-975-2486	RH444t@mailaps.org
Compositor	Leighton Greenough	301-762-7082	mlgreenough@erols.com
Necrologist	Rosemary MacDonald	301-975-2486	rosemarym@mac.com
Membership	Elizabeth King	301-770-7016	bking87383@aol.com
Nominating	Kenneth F. Gordon	301-469-9240	kengordon@alum.mit.edu
Portrait Gallery	Anneke Levelt Sengers	301-424-8089	sengers@mindspring.com
Nominations	Anneke Levelt Sengers		
	Richard Wright	See above	
Winners' Information	Noel J. Raufaste	301-949-4298	nraufaste@erols.com
	Elizabeth King		
Ceremonial Arrangements	Sara Torrence	301-948-1223	jimNsara@att.net
	Walter G. Leight		
Hospitality	Karma A. Beal	301-947-3475	kbeal@gpchurch.org
Historian	James A. Schooley	301-371-4443	jmaschooley@adelphia.net
Boulder Labs Liaison	Robert Kamper	303-444-0776	kamperbobjen@cs.com
Congressional Relations	Esther Cassidy	301-924-2686	esthercas@aol.com
Administrative Relations	Walter Rabbitt	301-865-5255	wrabb@erols.com
Database Support	John McKinney	301-469-6390	jumck@erols.com
NIST Liaison	Sandra B. Heydemann	301-975-3032	sandra.heydemann@nist.gov

Alumni Association Office:
Room A42, Administration Building
Mail Stop 0952
National Institute of Standards and Technology
Gaithersburg, MD 20899-0952
E-mail: alumni@nist.gov
Tel: 301-975-2486
Fax: 301-975-5378

The **SAA Newsletter** is published for the members of the Standards Alumni Association in March, June, September and December. Contributions of interest to members are welcome.

In addition to the editor Norman Belecki, Associate Editor Ralph Hudson and Compositor Leighton Greenough, members John Beers, Esther Cassidy, Edgar Etz, Bob Kamper, Jerome Kruger, Walter Leight, Rosemary MacDonald, John McKinney, Hans Oser, James Schooley, Reeves Tilley and James Wyckoff contribute on a regular basis.

Standards Alumni Association
National Institute of Standards and Technology
100 Bureau Drive, Stop 0952
Gaithersburg MD 20899-0952